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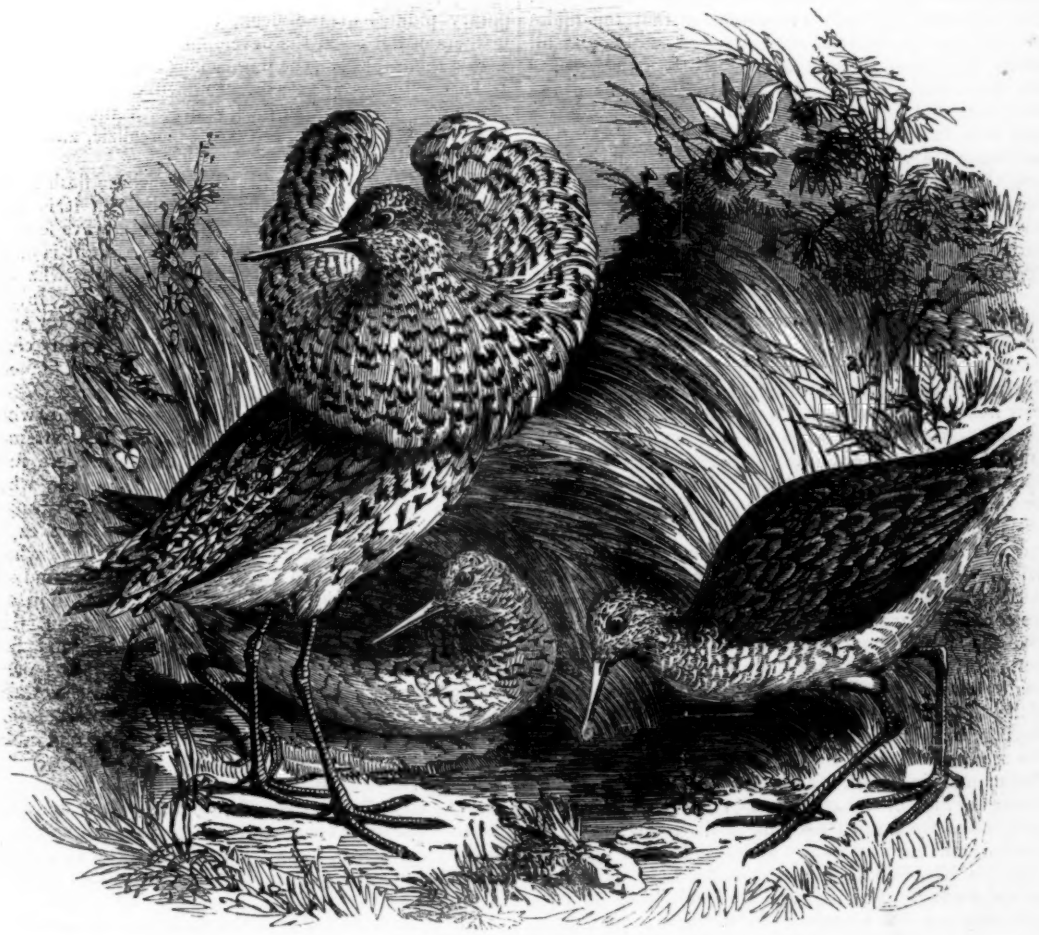
THE RUFF AND REEVE.



[The Ruff and Reeve.]

THE periodical changes which the plumage of the feathered race undergoes have long excited the attention of naturalists. To a great extent these changes are connected with atmospheric temperature. The severities of winter demand a warmer, a fuller, and often a differently coloured garment, in order that the vital heat of the system may be duly preserved. The autumnal change of colouring (where such occurs) is from variegated, or bright and rich tints, to dusky, or pure white; the spring change restores these tints again. But besides the changes here alluded to, and which have a special reference to the preservation of the temperature of the body in winter, and secondarily to concealment—changes which are exemplified most fully in the ptarmigan and other allied species,—there is another change of dress, if change it can be called, peculiar to many birds, which consists in the assumption of ornamental plumes in the males on the approach of spring. Among the species peculiar to the hotter climates of the globe, this arrangement predominates to a very great extent; but it is also remarkable in some species indigenous in our latitudes, and eminently so in the bird now before us (*Machetes pugnax*, Cuv.), of which the male, in consequence of the ornamental plumes on the neck during the breeding season is termed the ruff, while the female, to whose attire no such addition is made, is termed the reeve.

The ruff (applying the term, for convenience sake, as is usually done, to both sexes), belongs to the order *Grallatores*, and is one of our summer birds of passage, leaving our latitudes on the setting in of the cold months of winter. A few stragglers, however, occasionally remain with us during the whole of the winter season; and on one of the severest days of December last, an individual was shot on the banks of the Thames, near Hampton, by Mr. Gould, the author of the 'Birds of Europe' and other works on ornithology. This is certainly a very remarkable instance; indeed, we are not aware of another on record. The individual in question was a male in its plain or winter livery.

It is seldom before the middle of April that the ruff visits our island and the parallel latitudes of the adja-

cent continent, on its return from its winter quarters in the sunny districts of the south; and it is still later before it reaches more northern regions, for it extends its vernal migration even as far as the bleak shores of Iceland. Its favourite haunts and breeding-places are extensive fenny districts or marshes, where it can enjoy undisturbed seclusion, and procure food in due abundance. In England, the fens of Lincolnshire and Cambridge are its principal resort, but it occurs also in various other places of a similar character. In Holland it is very abundant. It would appear that the males are the first to arrive at their destined station; at all events they keep themselves in distinct bands, separate from the females. As the breeding time draws near, beautiful long plumes round the neck, forming a ruff, and large full ear-tufts, rapidly develope. The males now begin to *hill*, as it is termed—that is, they seek some spot a little elevated above the surrounding marsh, to which, as to a common centre, numbers are gradually drawn. Here each individual selects its own station or little territory, for the possession of which it strenuously contends; the attempt of a rival to encroach upon the circle is immediately followed by a hard-fought battle, the territory being ceded by the vanquished to the victor. These battles and contests are almost incessant, at least during the day; for at night they all return to the marsh in order to feed, (in this respect their habits being nocturnal), but in the morning each resumes its station, and the contests are again carried on. Here, full of animosity against each other, and jealous of each other's rights, they await the arrival of the females. The arrival on the hill of one of the other sex is the signal to a general contest. The scene is now one of perpetual warfare, female after female arriving at the hill, so that "the theatre of these battles," as Selby observes, "soon becomes bare of grass from the constant traversing of the combatants." Not only have the neck and ear plumes now attained their perfection, but the face of the male becomes covered with small yellowish papillæ, or fleshy excrescences, instead of the short feathers with which it is ordinarily clothed. During the whole of May and the early part of June, this scene of warfare continues with unabated energy. The manner in which the ruff fights has much resemblance to that of the game cock; the head is lowered, the plumes are thrown up into a disc, the tail is expanded, and each adversary attempts to seize the other with his bill, following up his advantage by a blow with the wing. The legs are too feeble to strike with, and they are not armed, as in the fowl; the contest, therefore, is seldom fatal, the vanquished being rather wearied out and dispirited by the superior strength and determination of his antagonist than seriously injured. Towards the latter part of June this combativeness abates, the papillæ on the face disappear, and shortly afterwards the fine plumes are moulted off, their place being supplied by ordinary feathers.

The females, or reeves, which, as we have intimated, only visit the hill at intervals, breed among the swamps. The nest consists of little more than a slight depression among a tuft of grass or rushes, or other herbage which luxuriates in such situations. The eggs are four in number, and closely resemble those of the snipe, only being somewhat larger. In the group of grallatorial birds, to which the present species belongs, the females usually exceed the males in size; here, however, the females are much smaller than the males, and moreover undergo no corresponding changes of plumage. With respect to the beautiful plumes which for a season ornament the ruff, one circumstance is very remarkable: we allude to the diversity of their colouring. In no two examples is the colour precisely alike. We have seen them pure white; white elegantly barred with black; reddish brown intermixed with black, or barred and spotted; pure glossy black; grey and black, &c. It appears, moreover, that in no individual are these colours the same for any two seasons.

There are several points in which this singular species evidences an analogy to the true gallinaceous groups of the Rasorial order. Agreeing in food and general habits with the tringæ and snipes, it differs from them in being decidedly polygamous, the females courting the society of the males, as is the case with the wild turkey and some others of the order *rasores*. The temporary plumes of the neck, resembling the hackled feathers of the cock, the development of fleshy excrescences about the face, the pugnacious habits, the jealousy of encroachment upon a preoccupied territory, put us in mind of the common fowl, and (with the exception of the hackles) of the pheasant, capercailzie, and black grouse.

The ruff is among the list of birds whose flesh is accounted as a delicacy for the table; indeed, it is held in high esteem, and the birds, therefore, always fetch a good price in the market. Considerable profit is made by various fowlers in the fens of Lincolnshire, who devote themselves at certain seasons of the year to the business of catching them and feeding them for sale. The means employed for taking them are chiefly clap-nets, into which they are lured by various devices, one of which is a stuffed bird of their own species. The seasons for taking them are, first, April and May, when the males are hilling, and pugnacious in the extreme; and secondly, September, after the young are fully fledged and ready for the autumnal migration, when they with the old birds pass to more southern latitudes. Few birds seem so indifferent and contented in captivity—a circumstance fortunate for the fowler, whose object is to fatten them for the market. Their natural food consists of worms, small insects, &c., with which the soft ooze or mud of the marsh abounds; but they are easily reconciled to a change of diet, and feed eagerly upon bread and milk, boiled wheat, and other articles of a farinaceous quality, upon which they thrive and become plump. Captivity, which subdues the spirit of most wild creatures, strange to say, does not abate the pugnacity of the full-plumed males taken in the spring. Not only will the appearance of a reeve excite them to strife, but a bowl of food set before them will produce the same effect, and lead to a tumultuous conflict, which, as the arena is very limited, and the weaker have no chance of escape, is sometimes known to result in fatal consequences.

Of the variable colour of the neck and ear plumes we have already spoken. The rest of the colouring may be thus described. The upper parts of the body are varied with a mixture of brown, pale yellow, and black; the sides of the chest and flanks are barred with black on a pale yellow ground. The under surface is white. In some individuals these tints are much darker than in others.

The reeve in summer has the upper surface varied with glossy black on a cinereous grey ground; in winter the colour becomes more uniform, losing the markings of black. The young of the year have the sides of the neck and chest and the region round the eye of a yellowish brown, with a tinge of orange, and the back is dark brown, glossed with purple, each feather having a deep margin of pale yellowish brown. In this stage it has been mistaken for a distinct species.

ON WHEATEN BREAD.

THE qualities of bread vary materially, not only in flavour, according to the species of grain of which it is formed, and the mode of manufacturing it, but also in its nutritive properties, for it has been shown by the analyses of chemists that 1000 parts of the corn usually

employed contain the following proportions of the different substances of which it is composed: namely,—

	Whole Quantity of Nutritive Matter.	Mucilage or Starch.	Saccharine Matter or Sugar.	Gluten or Albumen.
Wheat	955	765	—	190
Rye	792	645	38	109
Barley	920	790	70	60
Oats	743	641	15	87

It is thus evident that the same weight of wheat is capable of affording more nourishment than any other kind of bread; and, if estimated by measure, it is still superior, as the bushel weighs heavier than any white corn: the average of which, of the ordinary qualities, may be assumed as

Wheat 60 lbs. ..... Barley 50 lbs.
Rye 56 „ ..... Oats 40 „

In former times the peasantry of these kingdoms used only bread made of rye, oats, or barley-meal, and that of wheat was exclusively devoted to the nobility and gentry, with a few of the wealthy inhabitants of the great towns; indeed, so prevalent was the employment of inferior substitutes for this "staff of life," that, in the description of a farmer's life, as depicted in the 'Vision of Piers Ploughman,' which is supposed to have been written sometime in the 14th century, we find

"A few croddes and creyme, and a cake of otes,
And bred for my barnes (children) of beanes and of peses,"

in common use by persons of that class. In later days the progress of industry, and the consequent increase of the comforts of life, gradually introduced wheaten bread into more general consumption; and now all other grain has nearly disappeared in the formation of our household loaf. The use of oats in the shape of "crowdy," "stirabout," and "porridge," is indeed still common among the labouring classes of Scotland and Ireland, while in the north of England and some parts of Wales, a mixture of rye and wheat, under the name of "meslin," is usual among respectable families, and in the north of Europe rye-bread is universal. It is not, however, alone in the weight of nutriment that the superior advantage of bread made of wheat consists, but in the greater quantity which that grain contains of the substance termed "gluten;" which is considered by chemists as a sort of half-animalized matter, and not only imparts its peculiar flavour to the bread, but being also more adhesive and fermentable than the other ingredients, occasions it to rise better in the making, and its greater absorption of water renders it more spongy.

A Winchester bushel of wheat of fair quality, weighing 60 lbs., is usually calculated to yield 48 lbs. of household flour; which is the sort chiefly used for the manufacture of bread throughout England. The quantity of bread produced by the same weight of flour depends, however, in some measure upon the properties of the corn; and it has been shown by a comparative experiment tried a few years ago upon Scotch and English wheat, of apparently equal quality, that a quarter of the latter, though yielding rather less flour, yet when made into bread gave 13 lbs. more than the former, which is accounted for by the greater strength of sunshine under the climate of England having an effect upon the grain when ripening, which occasions the flour to absorb more water in the formation of the dough.

The corn, after being cleansed by the miller in a circular screen of wire, the scutchers of which are made to revolve with great rapidity, is then poured into the hopper of the mill, which, being placed over the burr-stones with which it communicates, and which grind it, feeds them gradually; the stones being set so close together as to convert the grain into a meal, which, when boulted, feels smooth if rubbed between the finger and thumb. When flour of different qualities is to be made, the process is, however, more complex: as thus—

The burr-stones are placed so far asunder as to cut the wheat into a coarse kind of meal, called "sharps," which is reground, with the stones set so close together, as by their friction to occasion so intense a degree of heat in the flour, that the hand can hardly bear it. It is then spread upon a floor, and kept continually turning until it becomes cool. When quite cold it is passed through a boulting-machine, which revolves on its axis, and is furnished with coarse wire-gauze, which permits the passage of the bran and pollard. The flour is then put a second time through a similar engine covered with the finest kind of wire-gauze, which divides it into the qualities termed "firsts" and "seconds," or fine and household; the proportions are usually ss follows:—

Fine Flour	25½lbs.
Household ditto	22½
Pollards	8
Bran	2¾
Waste	1½

A sack of flour must weigh, by the law of England, 280 lbs.; and when the assize of bread was fixed by the Lord Mayor of London, it was calculated as sufficient to make eighty-four quartern loaves of 4 lbs. 5 oz. each. The bakers, however, admit that if the flour be of good marketable quality, it will make eighty-six such loaves, or 370 lbs. 14 oz. of bread, equal to 92½ loaves of the present weight of 4 lbs. each. The charges on manufacturing a sack of flour into bread, and the baker's profit, were estimated at 15*s.*; it is thus evident that, when flour is at the actual price, as stated in the last returns, of 38*s.* per sack, the quartern loaf should be sold for 7*d.* Cheap bakers, indeed, charge only 6½*d.*, which they are enabled to do by means of slack baking, by the use of inferior qualities of flour, and by the mixture of a considerable portion of potato-meal, which, however, is so far from containing anything deleterious, that a small quantity of it, to the amount of not more than one-sixth, rather improves the appearance of the bread.

It may also be observed that the use of alum, which is so much decried by the public, as being injurious to the constitution, is not pernicious, unless when employed in quantities which never enter into the composition of bread; and the only unwholesome effect which can be in that case ascribed to it is, that it may occasion slight constipation of the bowels. It partly improves the colour of the bread, but the chief object of that, or any alkali, is to correct a certain degree of clamminess and unpleasant taste, approaching to acidity, which the bread acquires when made from new flour, or that which has been heated, or otherwise of indifferent quality. This, it is imagined, would be better attained by the application of magnesia; and it is the opinion of an eminent chemist that the addition of thirty to forty grains of the subcarbonate of magnesia to every pound of flour, in proportion according to its quality, would render the bread light, porous, good-tasted, and not the least clammy.

A Special Commission was appointed in the year 1817 by the French Government, for the purpose of inquiring into the state of the corn harvest, and framing directions for the management of damaged grain, and the baking of bread; the latter of which are as follow:

"As the yeast is the principal agent in the fermentation, nothing is more important than that it should be procured in the freshest and the best state.

"All potable-waters are good for baking: the best flour imbibes about one-half of its weight of water; middling good, from a fifth to a fourth. The tem-

perature of the water should be in an inverse ratio to that of the air,—that is, as much colder as the air is hotter, and *vice versâ*.

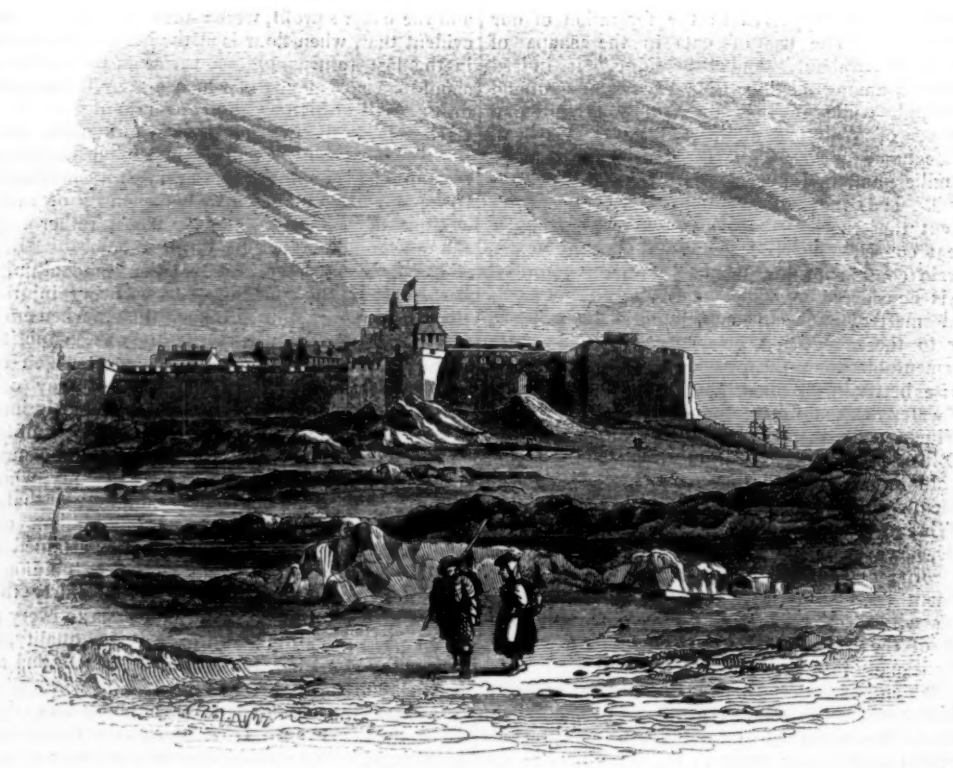
"The baking of flour which has been made from germinated wheat, ought to be proceeded in with much greater rapidity than that of flour from grain noways injured; because the gluten of such flour having been more or less destroyed, the process of its fermentation goes on much quicker. The water employed ought to be of less warmth in all the operations; the dough should be kneaded more firmly, and divided into loaves of smaller size; the batch should be put into the oven a quarter or half an hour sooner than usual, after it is completed; the oven should be raised to a higher temperature; the bread should be left in the oven only forty-five minutes, or less, instead of an hour, as in the ordinary case, and it ought not to be given out for consumption till two or three days after it has been baked."

By attending to these directions, bread made of damaged grain may be obtained sufficiently salubrious and of good appearance; but it is only by a mixture with good flour to the extent of one-half or two-thirds, that the taste of the loaf can be so improved as to entitle it to be considered as palatable household bread. It deserves also to be noticed, that the employment of a greater quantity of yeast than is usual in the fabrication of good bread, with a view of improving the quality of that made of inferior flour, will have a contrary effect; for although it may render its external appearance better, it will more fully develop the bad qualities of the flour in point of flavour.

Those persons who use home-made bread, and who naturally suppose that they are thus secure of having it of the best quality, yet can never be certain of that unless they also use their own wheat, and grind it themselves or attend to see it ground at the mill; for if they buy their flour of the miller or the baker, it will necessarily be in great part made from new wheat, and not improbably mixed up with that which is damaged. They should therefore keep a stock in hand, frequently turning and airing it in the granary, so as to keep it perfectly sweet, and not grind it until it is at least six months old. They need not be particular about the colour of the grain; for if it be plump, dry, and smooth, with a certain feel of mellowness when passed through the hand, it will assuredly answer all the purposes of excellent bread. The sweet, corny taste which is discernible in the brown loaf, arises from the skin which immediately envelopes the farina not being removed, as is done in the fabrication of fine meal; but this flavour can be retained in bread made of superfine flour, by mixing the dough with water in which a quantity of bran and pollard has been boiled.

ELIZABETH CASTLE,

BAY OF ST. AUBIN'S, ISLAND OF JERSEY



[Elizabeth Castle, Jersey.]

THE Channel Islands, though now for nearly seven centuries (since the Norman Conquest) an appendage of Great Britain, have been, until lately, comparatively little known to the great bulk of the British population. The nature of the government of the islands, their peculiar privileges, the manners, customs, and even the language (a corrupt Norman French) of the inhabitants, the former importance of the islands, with respect to commanding the British Channel, &c., are all matters of interest, which might naturally be supposed to excite curiosity; yet, with the exception of a few detached notices; a History of Guernsey, in 4to., which was published in 1815 by Mr. William Berry; and a lively and amusing History of Jersey, published in 1694 by the

Rev. P. Falle, (one of the parochial clergy of the island,) were the only accounts to be had, until the appearance, in 1834, of the late Mr. Inglis's interesting work, entitled the 'Channel Islands.'

Our present object is not to enter into any account of the islands, but simply to describe the object delineated in the engraving. The Bay of St. Aubin's, in Jersey, is the largest in the island: the tides rise and fall upwards of forty feet in it, so that the contrast between high and low water is very singular. At the head of the bay are the towns of St. Aubin and St. Helier's, the one at the eastern, the other at the western side; and between the two stretches a sandy, shelving beach, studded with Martello towers. St. Helier's is the chief town of Jersey. In the centre of the bay, within about three-quarters of a mile from the pier of St. Helier, is a large rock, not less than a mile in circumference, the surface of which is covered with the buildings and fortifications of Elizabeth Castle. The only access, on foot or horseback, from St. Helier's to the castle during low water is by a natural causeway, or beach of pebbles and sand, termed the bridge. When the tide is full the castle must be approached by water.

The Rev. Mr. Falle, speaking of Queen Elizabeth, says,—"That incomparable princess, knowing that 'tis a great part of wisdom, in the profoundest peace, to be prepared for war, had even at that time a careful eye on the safety of these islands. She began that noble castle in Jersey, which from her is to this day called Castle Elizabeth, but lived only to finish that part of it which is above the iron-gate, and is called the upper ward, the lower parts having been since added to that fortification." Many additions were made to the castle in Charles I.'s time. There is a tradition, mentioned by Inglis, that in order to defray the original expense of building Elizabeth Castle, all the bells of the churches and chapels of Jersey were seized, and shipped for St. Malo, to be sold; but that the vessel which carried them foundered in a storm, to the satisfaction of those who regarded the seizure as a sacrilegious act, and the loss, therefore, as a judgment from heaven. Falle simply says that an Order in Council was made in 1551, enjoining the bells of the island (leaving one in every church) to be sold, and the money to be applied to the building of the castle.

During the Civil War, the inhabitants of the Channel Islands adhered to the royal cause; and Elizabeth Castle, which was the residence of the governor of Jersey, made a stout resistance to the parliamentary forces; but the garrison were ultimately obliged to surrender. Sir Edward Hyde, afterwards the celebrated Lord Clarendon, resided in Elizabeth Castle nearly two years, during which he composed a large portion of his well-known history.

Elizabeth Castle, as a fortification, has been thrown into the shade by a huge fortress, termed Fort Regent, which was begun in 1806. It was erected at an expense of 800,000*l.*, as stated by Mr. Inglis, who seems also to be of opinion that the utility of the work bears no proportion whatever to the immense sum of money which it cost.

Of the present state of Elizabeth Castle the following quotation from Mr. Inglis's work will give a sufficient account,—the concluding sentiment will, we are sure, be assented to by every reader:—

"The rock on which Elizabeth Castle is built is not less than a mile in circumference; and I was surprised, on passing through the gateway, to find a wide grassy level, terminated by extensive barracks and their appurtenances. In war-time, this fortress was an important place, and, no doubt, presented to the eye and ears of the traveller a very different scene from that which it now presents. Decay seems now to be creeping over it; and although a solitary sentinel is still to be seen pacing to and fro; and although pyramids of shot still occupy their accustomed places, grass and weeds have forced their way through the interstices; and the rows of dismounted cannon show that the stirring days of war have gone by. May the weeds long grow, and the rust continue to creep over the engines of death!"

On the top of a rock, situated a little to the south of Elizabeth Castle, and, like it, accessible at low water, may still be seen the rude remains of a hermitage, the canonized tenant of which is said to have given name to St. Helier's.

CHINA.—No. XII.

Silk-worms and Silk.

The zoology of China offers to our consideration little that is new or peculiar. All the larger quadrupeds of China are common in many other parts of the world, and are too well known to require any description. We shall also spare our readers the description of flying cows and flying apes,—of the baboons on the mountain Tayung, in the province of Suchuen, "which in bigness and shape are very like a man,"—of the musk-deer, which when taken out of the kingdom of Lu into the kingdom of Laos "dies instantly, like a fish which is taken out of the water,"—and of all the other marvellous beasts, birds, insects, and fish, which Marco Polo, and, after him, credulous missionaries or imaginative Dutchmen, palmed upon an age that had a surpassing facility of belief. We will only dwell on what is peculiar to China and authentic or curious.

In the zoology of China there is, in fact, nothing more worthy of notice than that which is, to all appearance, the most humble and insignificant;—this is the silk-worm, the history of which, and of its valuable product, is full of interest and instruction.

In the best ages of Greece and Rome silk was hardly known but by report; and the little information obtained by the interest and curiosity of merchants was confounded and obscured by being mixed up with some notions of the cotton-plant. The soft wool of the Chinese is celebrated by Virgil as combed from trees; and nearly four centuries elapsed before a distinct knowledge of the truth found its way to Europe. The manufactures of this precious substance—then more costly than gold—were patiently unravelled by the artists of Greece, and re-manufactured with a mixture of some less costly material; the transparent garments formed of the mingled stuff were worn by ladies of high rank at Rome, and the moralists of the time were strong in their disapprobation of the indecent innovation. The terms of "woven air" and "textile clouds" will demonstrate the extreme thinness which the high price of the material or the caprice of the purchaser compelled the workman to produce. But the communication between China and the western world, which the wars of the Roman and Parthian empires had restricted, became more easy by the destruction of the latter in the third century;—the supply of silk increased, and a rich Roman might now, without the imputation of extravagant luxury, be clothed in the gorgeous fabrics of the East. In the reign of Justinian (A. D. 552) the valued manufacture was brought to Europe. The missionaries of the Christian religion had successfully preached the Gospel in India, and had even penetrated into China. Two Persian monks, during a long residence in that country, had carefully considered the advantages which might accrue to the western world by the introduction of the insect itself, instead of the precarious and expensive importation of its produce. Their proposal was eagerly embraced by the enlightened Justinian; and after many attempts, and some danger, a sufficient number of eggs was en-

closed in the hollow of a cane, and successfully conveyed to Constantinople. Plantations of mulberries had been prepared: after some awkward attempts, silk enough was produced to show that a proper method had been adopted; the artists of Greece gradually approached perfection, and, in a few years, equalled or surpassed those of China. The ingenuity of the Arabs discovered the secret in the eighteenth century, and the manufacture was introduced in the dominions of the caliphs; but the profitable monopoly of supplying the Christian world was retained by the Greeks until the twelfth century, when the Norman Roger, after his conquest of western Greece (A. D. 1146), by an enlightened policy, most uncommon in that age, carried off among the prisoners a number of silk-weavers and spinners, whom he settled at Palermo. Sicilians were instructed in the process;—Italy soon acquired the valuable art;—and the manufacture has gradually spread itself over the western world. The artists of London now rival those of China, and under the superior management of Europeans the insect itself has improved. A healthy cocoon, which hardly ever equals a grain in China, has been known to weigh three grains in England, and the average of many thousands show a weight of more than two grains.

There is every reason to conclude that the silk-worm has been cultivated, and silk woven in China, from the most remote antiquity. As the necessity for clothing must have long preceded that of recording events, the inventions of the loom and distaff are lost in the uncertainty of tradition. The mythologists of the west have ascribed these inventions to the gods; and in like manner the ancient monarchs of China, who in their traditionary history play the part of gods, are said to have been the inventors of the silk-manufacture. For nearly twenty centuries Europe has received silk from the East: the names given to it on its introduction sufficiently indicate the country from which it came. The Greek name Σῆρ resembles the word implying silk in most of the Chinese dialects, and is identical with the pronunciation of Corea *seer;* in the mandarin dialect it is pronounced *sze;* but in a language of which the written character affords no indication of sound, the pronunciation must be as varied as in those savage tongues which are not at all committed to writing. The Latin name sufficiently resembles the Manchoo and Mongol *sirke* and *sirkek*, to show the people by whom the silk was carried on its departure from China. Those names, altered perhaps in their long journey over central Asia, acquired from the cultivated organs of the Italians the more agreeable form of *serica*, by some modification of which it is still known in most of the languages of Europe.

In ancient times an example of industry was annually given by the empress of China, who fed the laborious insects with the leaves she had gathered with her own hands, from trees growing within the verge of the imperial palace. The produce of the worms was afterwards spun and woven by herself. This was a politic mode of inducing habits of industry; and it appears to have been retained, on account of the pleasing nature of the occupation, long after the necessity of example had ceased. Since the accession of the present family the custom has been discontinued: a part of the palace is, however, still stocked with insects and mulberry-trees for the amusement of the royal ladies; and the government has not neglected the manufacture. Treatises of considerable extent have been published to point out the best mode of rearing worms and managing silk, showing in complete detail the best method of preserving and of hatching the eggs and feeding the worms, the diseases to which they are subject, and the modes of prevention and cure; the best form of building, and manner of warming and ventilating their habitations, and every other particular. The precautions recommended, although not rigorously adopted by every manufacturer, have greatly tended to improve the quantity and quality of the produce.

During the fine season, worms are reared and silk made in almost every house, and any spare room is used for their habitation; but by those who make the rearing of worms a profession, a dry airy spot is chosen, free from pungent smells and loud noises: a square room is built with the entrance if possible towards the south. It is usual to have a window on each side covered with white paper to exclude the air, and provided with thick blinds to shut out the light when darkness is necessary. A stove, or more, is furnished to keep up a constant and equal temperature throughout the room, and to prevent any chance of damp, which is very injurious to the worm. Around the room several rows of shelves are fixed, one above another, about a foot apart,—not against the wall, but leaving a clear passage, wide enough for a person to walk outside all round the room, and an open space in the middle. These shelves are formed of rushes or withies, and are intended to receive the worms when hatched. The hatching may be accelerated or retarded at pleasure by exposing the eggs to heat or cold; and the usual practice is to keep them in a cold place until the mulberry-trees have put forth their young leaves: the paper on which the eggs are deposited is then brought out, and hung up in such a situation that the sun may shine on the back of the sheets; this is repeated for two or three days, during each of which the paper is allowed to remain exposed to the rays of the sun only long enough to acquire a gentle warmth: a great heat would be very prejudicial. On the fourth day a great number of the eggs will be hatched. All the worms which leave the eggs before this time are thrown away, as they would not agree with the others in the times of eating, casting their skin, or spinning, which would be the cause of much additional trouble to the attendants. The papers are then carefully weighed, turned upside down, and gently placed upon young mulberry-leaves, cut into small shreds to be more easily masticated by the tender worms. The smell of the fresh leaves soon induces the worms to leave the paper, which is again carefully weighed; the weight of worms is of course known by the difference of the present and former weights, and the quantity of food regulated accordingly*.

In the first days of their existence the Chinese worms are fed nearly every half hour, and the number of meals is gradually diminished, as the worms grow older. After a few days they are fed four times a day, and the leaves are no longer shred, but given whole as they are gathered; after this the number of meals suffers no diminution†.

The daily process of feeding the worms is very carefully attended to; they are kept free from noise, bad smells, or other causes of annoyance; and in some places even the food and dress of the attendants are scrupulously regulated. Small stoves are used occasionally for drying the air of the apartment during the prevalence of damp weather: shades are placed over the windows when the heat of the sun would be excessive; in case of a drying wind, small vessels of water are interspersed between the shelves to refresh the air of the room; if the worms appear sickly and

* The Italians usually procure the deposition of eggs upon cloths, from which they are detached by washing. The eggs are then kept in little bags, in as cool a place as possible, until the mulberry-trees are in leaf, when they are hatched in a stoved room, of which the heat is gradually raised from 65° to 80° of Fahrenheit. The process usually occupies twelve or fourteen days.

† In Italy it is usual to feed the worms four times a day from the first; when very young they receive chopped leaves, and in about sixteen days the chopping is discontinued.

heated, a fine powder of dry mulberry leaves is thrown over them; in short, every precaution is taken which the interest of the proprietor may suggest, or the delicate habits of the animal may seem to render necessary.

Notwithstanding every precaution, the worms sometimes die, particularly at the time of moulting, or casting their skin. This is a season of danger which occurs three times during the short life of a silk-worm. In the fourth day of its existence it falls sick, refuses food, and is then said by the Chinese to sleep: within twenty-four hours it casts its skin with much apparent pain; two days usually elapse before health and appetite return, and after two days of health a second sleep approaches; the pain and danger is repeated, and after an equally short interval of health, the third and last sleep attacks the laborious insect. When this sleep is completed, the worm enjoys a longer interval of health than at any other period: for five or six days it continues to eat heartily, and then begins to spin the "golden tomb," to the formation of which its whole existence appears consecrated.

The silk-worm of Europe has one step of danger more than that of China, and casts its skin four times instead of three. It is the opinion of some naturalists that this difference must be the effect of climate; but such a supposition is negatived by the fact that the silk-worm of three casts, like that of China, is known in Europe, and that in some districts of Lombardy it is reared as well as that of four casts, though the latter is preferred from the larger quantity of the produce. The worm of four casts being the best known in Europe, was probably the species introduced by Justinian; the smaller sort was most likely imported in one of the many vessels which have sailed between Europe and China for nearly four centuries. Both species are cultivated in Bengal, and are both thought by the Hindoos to have been brought from China. The smaller sort is known there by the name of the monthly worm, and can be brought to spin eight or ten times a year; the other is called the annual worm, and produced silk in March only*.

SEBASTIAN CABOT.

Sebastian Cabot, a maritime discoverer of great eminence, who, in all probability, was the first European who reached the main land of the New World, was born in Bristol about the year 1477. His father, Giovanni Gabota, or John Cabot, as he is usually called, was a Venetian adventurer†, settled in Bristol, who obtained the notice of Henry VII. during the arrangement of a treaty with the King of Denmark, by which Bristol was considerably benefited. Sebastian Cabot was instructed by his father in the various branches of nautical science as it was then taught, and before he had attained the age of seventeen he had been to sea several times. But the first voyage of any importance in which he bore a part, appears to have been when he accompanied his father for the discovery of unknown lands with the hope of finding a north-west passage to India. The discoveries of Columbus, who returned from his first expedition in 1493, having attracted the attention of Europe to the New World, on the 5th of March, 1495, John Cabot received letters-patent from Henry VII., directed to himself and his three sons,—Lewis, Sebastian, and Sancius,—authorizing them to "saile to all parts, countreys, and seas of the east, and of the west, and of the north." They were to subdue and occupy all towns, cities, castles, and islands for the king, who reserved to himself a fifth part of the profits of the voyage after the payment of all expenses; and they were directed to return to the port of Bristol.

Cabot did not set out on this voyage for some time afterwards; for we find that, on the 3rd of February, 1497, Henry VII. gave him license to take six English ships, of the burden of 200 tons, or under, and as many mariners as were willing to go with him. One ship, in which some merchants of London were interested, was equipped at Bristol at the expense of the king. She was attended by four small barks, fitted out by the merchants of that city, and laden with "coarse cloths, caps, lace-points, and such other." John Cabot, accompanied by his second son Sebastian, sailed in the spring of that year (in a manuscript calendar of the city of Bristol 1499 is the year mentioned), steering to the north-west, in the hope of reaching India by a shorter course than that which Columbus had taken, and of reaching the coast of *Cathay*, or China, of the fertility and opulence of which the descriptions of Marco Polo had excited high ideas. After sailing for some weeks due west, and nearly on the parallel of Bristol, they made the discovery of Newfoundland. The day on which this occurred is known by a map drawn by Sebastian Cabot, and cut by Clement Adams, which hung in the Privy Gallery at Whitehall. Under the author's picture was this inscription, "Effegies Seb. Caboti, Angli Filii Jo. Caboti, Venetiani, Militis Aurati," &c. On this map was likewise a narrative of the discovery, the original of which was in Latin, and which, as well as the following translation, may be seen in 'Hakluyt,' vol. iii., p. 27. "In the yeere of our Lord 1497 John Cabot, a Venetian, and his son Sebastian, with an English fleet, set out from Bristol, and discovered that land which no man before that time had attempted, on the 24th of June, about five of the clocke, early in the morning. This land he called *Primavista*, that is to say, first seene, because, as I suppose, it was that part whereof they had the first sight from sea. That island which lieth out before the land he called Island of St. John, upon this occasion, as I thinke, because it was discovered upon the day of John the Baptist. The inhabitants of this island used to weare beasts' skinnes, and have them in as great estimation as we have our finest garments. In their warres they use bowes, arrowes, pikes, darts, woodden clubs, and slings. The soil is barren in some places, and yeeldeth little fruit, but it is full of white beares and stagges, far greater than ours. It yeeldeth plenty of fish, and those very great, as seales, and those which we commonly call salmons: there are soles also above a yard in length, but especially there is a great abundance of that kinde of fish which the sauages call baccalaos (codfish). In the same island also there breed hauks, but they are so blacke that they are very like to rauens, as also their partridges and eagles, which are in like sort blacke."

Having brought away three of the natives, Cabot proceeded westward, and soon reached the continent of North America, sailing along it from the fifty-sixth to the thirty-eighth degree of latitude, from the coast of Labrador to that of Virginia, till he came to Florida. It does not appear that he landed anywhere during this extensive course, and he returned to England without attempting either settlement or conquest in any part of that continent, though he returned with a good cargo. The accounts of this voyage are in some measure involved in obscurity, and it is conjectured that Sebastian Cabot made some voyages without his father in the reign of Henry VII.; for during a period of nearly twenty years, no authentic detail of his life or

* The Bengal worm has degenerated of late years, and several attempts have been made to introduce a better breed, by bringing eggs from the N.W. provinces of China, whence the first silk-worms were sent to Europe. These attempts have failed; the annual worm (chosen as the best sort) has in a short time changed its distinctive character, and become monthly. Attempts are now making by the East India Company to convey the European eggs to Bengal, by first naturalizing the breed on the island of St. Helena, all their endeavours to convey the eggs direct to Bengal having failed.

† According to Stowe and Grafton, John Cabot was a Genoese.

proceedings is extant. Nor is it known at what time or in what place his father died. No further attempt at discovery was made in England in the reign of Henry VII., and we hear no more of Sebastian Cabot till 1516, when he became connected with Sir Thomas Pert, then vice-admiral of England, who obtained a king's ship for the purpose of making discoveries. Sebastian Cabot seems at this time to have intended to proceed to India by the south; for he sailed first to Brazil, where, failing of success, he steered for the islands of Hispaniola and Porto Rico. The design of Cabot was by various accidents completely frustrated. It is supposed that this disappointment disposed him to leave England and enter the service of Spain, where he was appointed *piloto mayor*, or grand pilot; and by the nature of his office he was intrusted with the review of all projects of discovery, which at that time were numerous and important. His great ability and reputation induced several opulent merchants to negotiate with him in 1524 concerning a voyage to be made at their expense by the new-found passage of Magelhaen to the Moluccas; and Cabot sailed from Cadiz on this expedition, (of which there is an account in the Spanish historian Herrera) with four ships, in the early part of April, 1525.

The dearth of provisions and a mutiny among his men prevented the completion of his original plan, of going to the Spice Islands. He sailed up the Rio de la Plata (river of silver), where he found an island about a league in circumference, and half a league from the continent towards Brazil, which he called St. Gabriel. Here he anchored, and taking the boats three leagues further, he discovered a river, which he called San Salvador, or St. Saviour. Finding it deep and a safe harbour for ships, he brought up his vessels and unloaded them, because there was a deficiency of water at the mouth of the river; he left a few men in a fort that he had built, and continued his course up the river with boats and a flat-bottomed caravel, in the hope that his voyage might hot be altogether fruitless.

After various adventures, in which he was occupied nearly five years, he embarked the remainder of his men and all his effects in the largest of his ships, leaving the rest behind him. In the spring of 1531 he arrived at the Spanish court, where, apparently, he was not very cordially received; for his treatment of his Spanish mutineers had made him many enemies, and the merchants were dissatisfied that he had not gone to the Moluccas. He, however, retained his place, and continued some years in the service of Spain, till his return to England, which is supposed to have been about the close of the reign of Henry VIII. In the commencement of the reign of Edward VI., Cabot was introduced to the Duke of Somerset, then lord protector, who received him with great consideration, and presented him to the king.

On the 6th of January, 1549, he was constituted Grand Pilot of England, and received a pension for his life of 166*l.* 13*s.* 4*d.* a-year. In this year, according to Strype, (Memorials, vol. ii.,) the emperor, Charles V., desired that the king should send Cabot to him, as he could be of little service to the English, who had not much to do with the Indian seas, and as he was his servant, in the capacity of grand pilot of the Indies; but this application was not complied with. Cabot continued high in favour with Edward VI., and his advice was sought on all matters relative to commerce, and especially in the important business of the merchants of the Steelyard in 1551. These merchants, who were originally from Germany, had settled in England in or before the reign of Henry III. They imported various merchandise, among which was steel, from which their residence acquired the name of the Steelyard. They had been encouraged by many privileges, which, as the English trade increased, proved a source of annoyance. On the 29th of December, 1551, the Company of Merchant Adventurers, at the head of whom was Cabot, exhibited an information to the Privy Council against them, and, after several hearings, they were declared not to be a legal corporation.

As a communication with China and the Spice Islands by some other route than that of the Cape of Good Hope continued to attract the attention of the English, Cabot, whose opinion was of great weight, urgently pressed them to make another attempt, which he proposed to be north-east; and he supported this advice by such reasons as to excite sanguine hopes of success. Several persons of rank and eminent merchants formed an association, which was incorporated by a charter from the King as "The Company of Merchant Adventurers for the Discovery of Regions, Dominions, Islands, and Places unknown;" and Cabot, appointed governor of this company, soon prepared two ships and a bark, which he furnished with instructions from himself, which bear date the 9th of May, 1553. These instructions, which were to be read once a week to the ships' companies, may be seen at length in Hakluyt, vol. i., p. 251; and they afford the clearest proofs of Cabot's naval skill and mercantile sagacity. The following curious passage occurs in them:—"And if any person [of the natives] taken may be made drunke with your beere or wine, you shal know the secrets of his heart." In consideration of his trouble on this occasion, the king granted him 200*l.* There is so much variation in the accounts and dates respecting this voyage, that it has been supposed that they apply to two different voyages; but on the other hand, it appears that there is no distinct relation of any other attempt in the northern seas except this under Sir Hugh Willoughby, the result of which was the trade to Archangel in Russia.

Cabot took an active part in the transactions of the Russia Company. In the journal of Stephen Burroughs, (Hakluyt, vol. i.) it is stated that on the 26th of April, 1556, he went to Gravesend; and when on board the Serch-thrift, a small vessel fitted out for Russia, under the command of Burroughs, he gave to the "mariners right liberal rewards," and on his return to Gravesend he generously bestowed alms on the poor, wishing them to pray for the prosperity of the voyage. On this occasion he made a banquet at the sign of the Christopher at Gravesend, where, as Mr. Burroughs says, "for the very joy he had to see the towardness of our intended discovery, he entered into the dance himself," and in further evidence of his excellent qualities, we find in the 6th chapter of the third Decade, that Peter Martyr says "Cabot is my very friend whom I vse familiarly, and delight to have him sometimes keepe mee company in mine own house." The renewal of his patent is the last information that we possess of this remarkable man, who is supposed to have died some time in the following year, when he was probably nearly eighty, though his age has not been accurately ascertained. By his biographers Cabot is asserted to have been the first who made the important discovery of the variation of the compass; but in Irving's 'Life of Columbus,' (vol. i. p. 201) it is stated that when 200 leagues from Ferro, on the 13th of September, 1492, "Columbus for the first time noticed the variation of the needle, a phenomenon which had never before been remarked," and this occurred at a period before Cabot could, from his tender age, have made the discovery.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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